

## Proactive Approach with a View to Creating Ever Better Environment

As a provider of energy services that are closely connected with the environment, the Kansai Electric Power Group fully recognizes the scale of impact its business activities have on the global environment and therefore will strive to alleviate the environmental burden and environmental risks accompanying our business activities. Furthermore, we will aspire for creating ever better environment and contribute proactively to the development of a sustainable society through provision of products and services having lesser environmental impact.

## Kansai Electric Power Group Environmental Action Policy

Based on our Kansai Electric Power Group CSR Action Charter, as an energy business that has a deep connection to the environment, we are formulating the Kansai Electric Power Group Environmental Action Policy as the environmental management policy to be pursued by our group over the medium- and long-terms. We are realizing this policy through deliberations by our Environmental Board chaired by our

Executive Officer in charge of environmental affairs.

As issues that should be considered in the conduct of our business activities, the Kansai Electric Power Group Environmental Action Policy expresses four main focuses that should be followed in our efforts, including “initiatives contributing to the realization of a low-carbon society.”



### Initiatives contributing to the realization of a low-carbon society

- Lowering electric power's carbon intensity
- Technological developments for constructing the Smart Grid
- Contributing to energy conservation, cost reductions and CO<sub>2</sub> emissions reductions for customers and society
- Overseas activities
- Technical development efforts
- Value chain efforts
- Efforts to reduce greenhouse gases other than CO<sub>2</sub>



### Initiatives contributing to the realization of a recycling-oriented society

- Promotion of proactive 3R efforts aimed at zero emissions
- Promoting safe, reliable, and complete disposal of PCB wastes
- Promoting green procurement



### Promotion of environmental protection in local communities

- Measures to prevent air and water pollution, etc.
- Efforts to strictly manage and reduce toxic chemicals
- Considering the preservation of biodiversity



### Promoting environmental management and environmental communication

- Continuous improvement using environmental management systems based on ISO 14001 systems and strict adherence to laws and regulations
- Active advancement of environmental awareness raising activities with local communities and customers and disclosure of environmental information

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## Promoting environmental management

### Building environmental management systems that incorporate the approaches of ISO14001

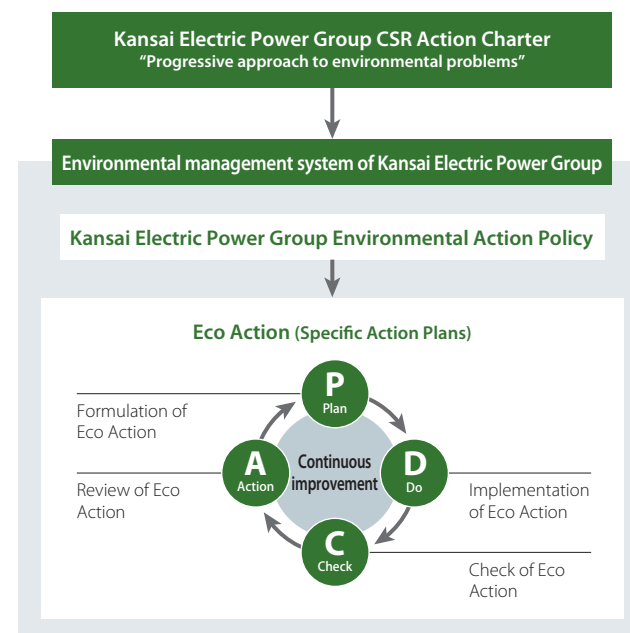
Based on our Environmental Management Directive in which fundamental items are established in accordance with an ISO 14001 system, we present the Kansai Electric Power Group Environmental Action Policy to our entire group, formulate Eco Actions as specific action plans and improve them continuously by implementing check and review measures. In these ways we are making efforts to minimize environmental impacts and risks under the leadership of our president who is the Chief Environmental Management Officer of our company.

At our company, led by our president, head of each division is designated as the officer in charge of environmental management for the entire division and promoting environmental management independently. The Office of Corporate Planning and the Office of Energy and Environmental Planning utilize their expert knowledge in the environmental field and support the independent environmental management of each division and group company, communicating about environmental management as appropriate, confirming the status of their efforts and providing advice and guidance.

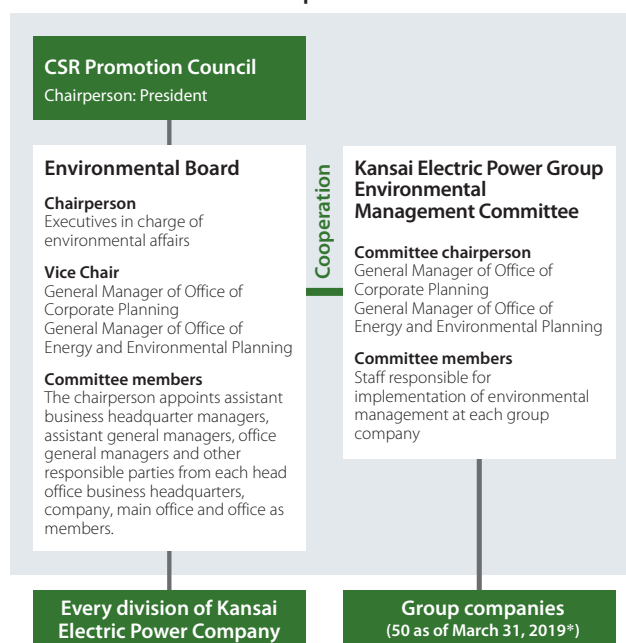
As a deliberative body, our Environmental Board, chaired by our Executive Officer in charge of environmental affairs, is held once a year and conducts checks and reviews of the Kansai Electric Power Group Environmental Action Policy and the Eco Action of the entire company as well as deliberates plans for the next year. Important issues are reported to the Sustainability and CSR Promotion Council, chaired by the president, which undertakes the formulation of policies that

contribute to the advancement of CSR throughout the entire group and the sustainable development of society. Moreover, as a deliberative body for group companies, once or twice a year we hold a Kansai Electric Power Group Environmental Management Committee meeting for department heads from each company to discuss group company Eco Actions and risk management. This Committee coordinates with the Environmental Board as necessary.

#### Environmental management system of our corporate group (PDCA cycle)



#### Environmental management promotion system of the Kansai Electric Power Group



\* The 50 companies, which are selected from 79 consolidated subsidiaries and 4 equity method affiliates, exclude those that have low environmental impacts.

### Environmental education (practical knowledge and awareness raising)

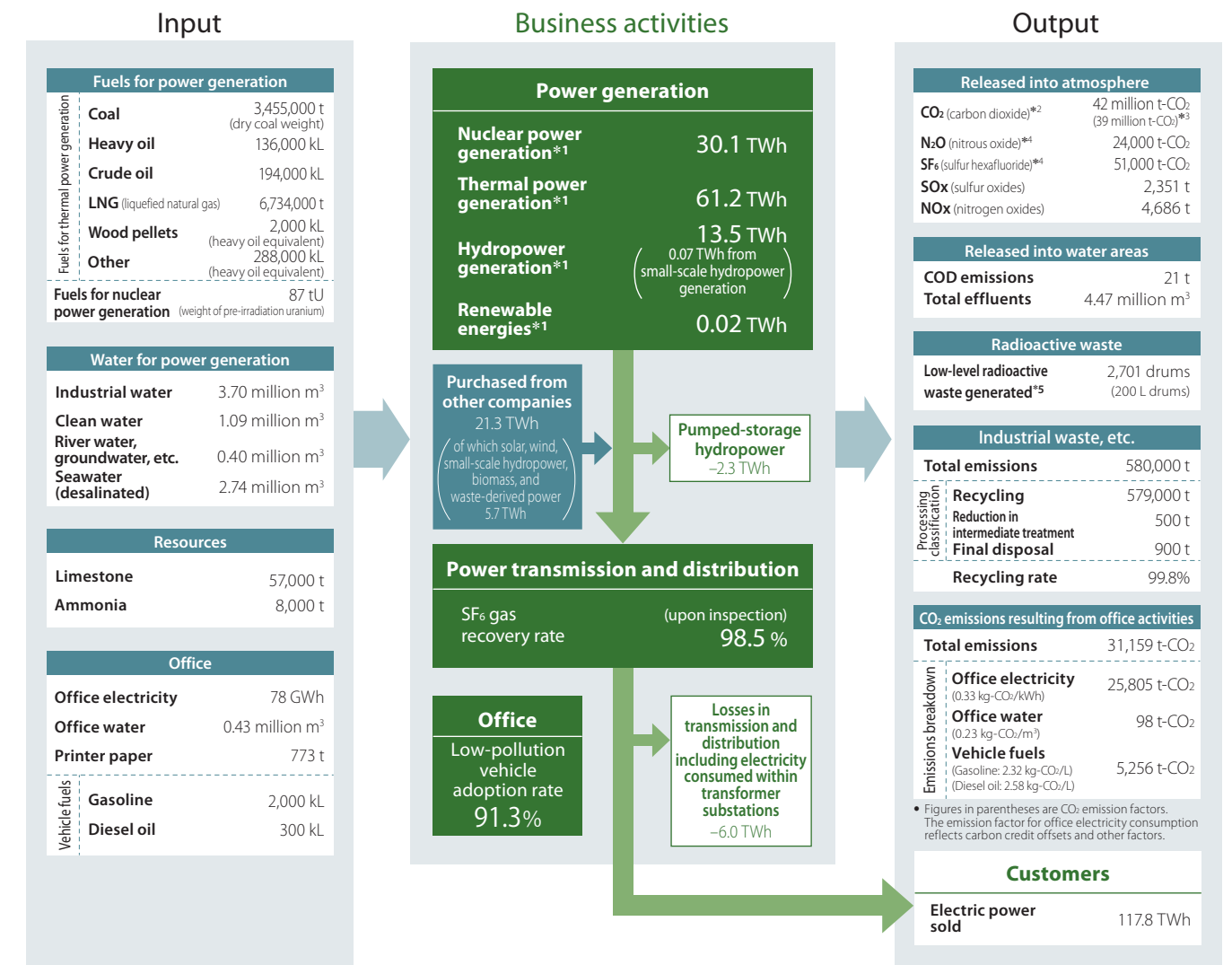
We conduct education for our employees in order to develop human resources that understand the Kansai Electric Power Group Environmental Action Policy and are able to implement it.

Specifically, we are conducting specialized education to provide practical knowledge as well as general education for all employees to raise awareness by conferring knowledge related to efforts for the environment by society and our corporate group.

### Strict adherence to laws, regulations and other rules

We are striving to adhere strictly to environmental laws, regulations and environmental protection agreements. In fiscal 2018, there were no press releases about violations related to these environmental laws, regulations and agreements.

## Status overview of our business activities and environmental load (FY 2018)



Note 1: This table contains non-consolidated figures for Kansai Electric Power Co., Inc. only.

Note 2: Totals may not sum due to rounding.

Note 3: Thermal power generation figures do not include biomass power generation.

\*1 Includes amounts of power for inside power plants

\*2 Includes CO2 originating from electricity purchased from other companies

\*3 Emissions taking carbon credits into account

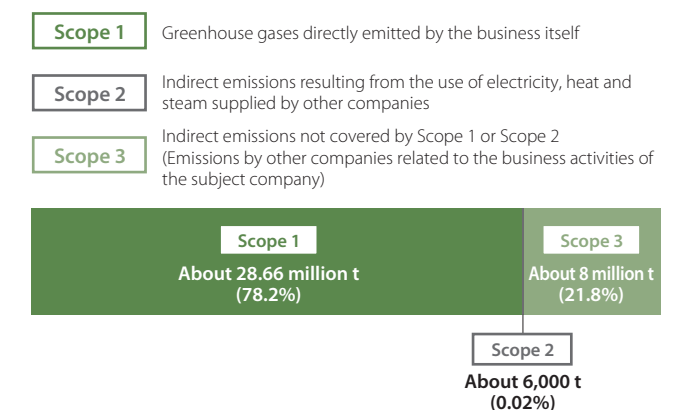
\*4 CO2 conversion

\*5 Net generation (generated amount - reduced amount)

### Greenhouse gas emissions in our corporate supply chain

We calculate the amount of greenhouse gases emitted in our entire supply chain in accordance with the Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (ver. 2.3) issued by the Ministry of the Environment and the Ministry of Economy, Trade and Industry.

As an energy business, considering that about 80% of our total emissions falls under Scope 1, we are steadily making efforts toward the realization of a low-carbon society including lowering the carbon intensity of electricity.





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Eco Action

Based on the Kansai Electric Power Group Environmental Action Policy and management plan guidelines, we have established Eco Action measures as specific action plans for environmental management.

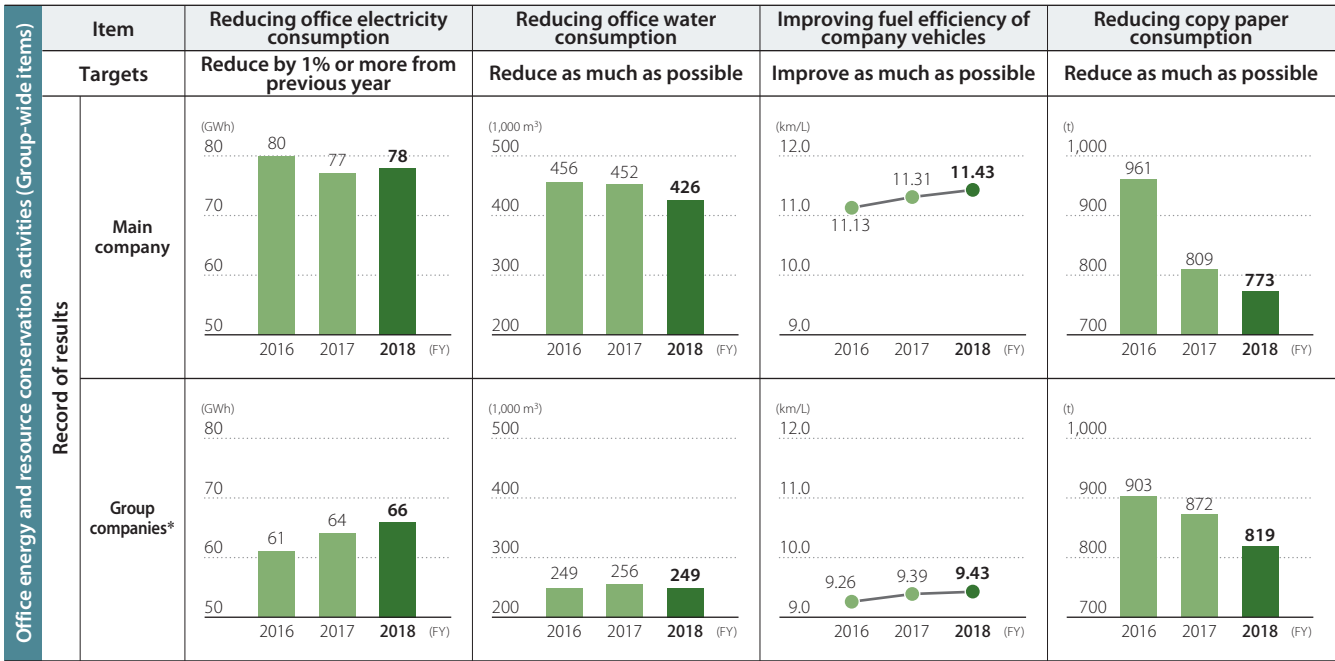
Among the Eco Actions we conduct along with business activities, considering impacts on the environment and the expectations of society and stakeholders, we select especially important items as company-wide Eco Actions and subject them to management review by the Environmental Board.

Moreover, we have set four actions undertaken in offices, including the reduction of office electricity and water use, as “office energy and resource conservation activities” that are shared throughout the Group.

In our fiscal 2019 Eco Actions, responding to the increasing need to reduce carbon, we set targets related to the advancement of efforts to control CO<sub>2</sub> emissions for individual companies and changed targets related to maintaining and improving the thermal efficiency of thermal power plants. We also added efforts to actively advance the development of renewable energy sources in Japan and abroad as well as to reduce transmission and distribution loss. In addition, we revised our targets related to maintaining ratios of sulfur oxide (SO<sub>x</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions to power generated.

Company-wide Eco Action items

Main environmental initiatives arising from our business activities	Initiatives contributing to the realization of a low-carbon society	
	Advancing efforts to control CO <sub>2</sub> emissions	P56-60
	Continuing safe and stable operation of nuclear power plants	
	Developing and utilizing renewable energy sources further	
	Maintaining and improving the thermal efficiency of thermal power plants (lower heating value base)	
	Reducing transmission and distribution loss	
	Promoting use of innovative forms of energy among customers and communities	
	Controlling SF <sub>6</sub> emissions (calendar year basis) (gas recovery rate upon inspection/removal of equipment)	
	Initiatives contributing to the realization of a recycling-oriented society	
	Maintaining industrial waste recycling rate	P61
	Processing PCB waste properly	
Promotion of environmental protection in local communities		
	P62	



\* Calculated for 42 companies for each FY 2016–2018.

Initiatives contributing to the realization of a low-carbon society

Policy and concept

Social background

In the Paris Agreement that established a framework for climate change countermeasures, every country is expected to submit and revise greenhouse gas reduction targets every five years.

In response, the Japanese government set a target to “reduce greenhouse gas emissions 26% by fiscal 2030 compared to fiscal 2013.” This target is integrated with the 2030 energy mix established by the government. Accordingly, electric companies that have most of the sales share in Japan, including our company, established the Electric Power Council for a Low Carbon Society (ELCS). The Council indicated in its Low Carbon Society Action Plan that it seeks to achieve an emission factor of about 0.37 kg-CO<sub>2</sub>/kWh (energy used) by fiscal 2030 based on that energy mix.

efforts, we will keep the top spot for the amount of CO<sub>2</sub>-free power generation in Japan, and halve CO<sub>2</sub> emissions associated with power generation in Japan in fiscal 2030 compared to fiscal 2013.

Specifically, we will pursue “low carbon strengths,” including the utilization of nuclear power generation with the most emphasis on safety and through the further development, incorporation and utilization of renewable energies as well as by improvement of the efficiency of thermal power plants and other efforts. Moreover, we will increase the electrification ratio in society and advance the efficient use of electricity. In addition to the advancement of these efforts in both supply and demand, we will build a next generation network that is prepared to incorporate large amounts of renewable energy as a means of connecting them.

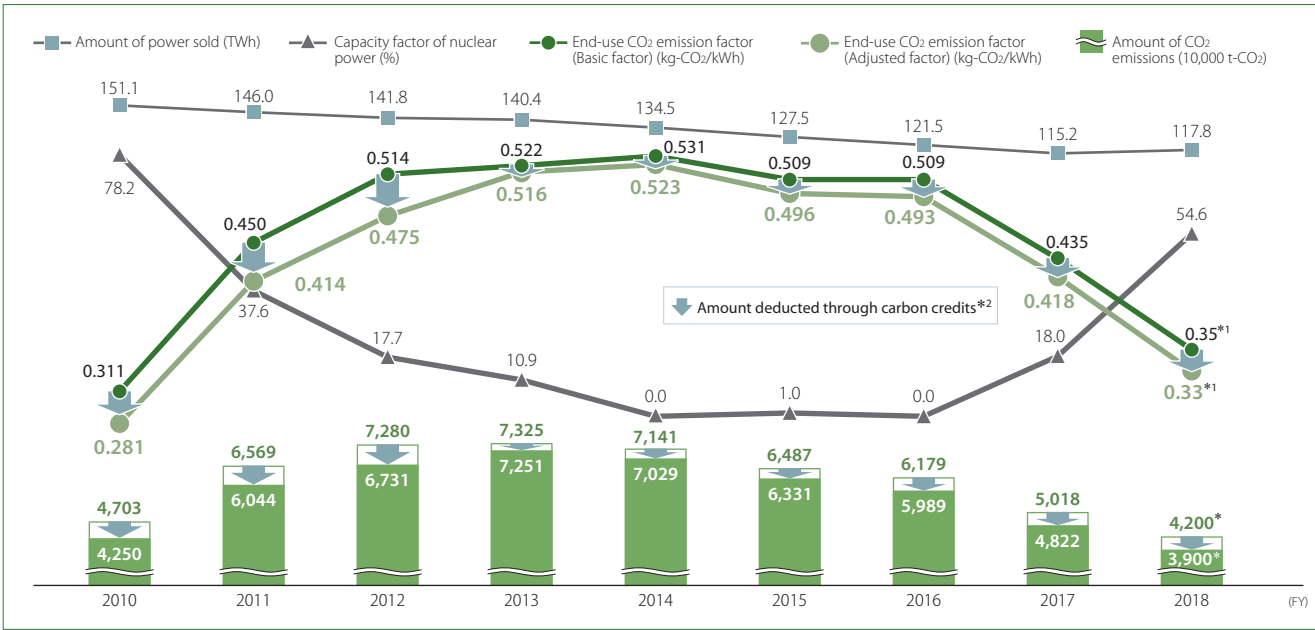
Targets and efforts to achieve them

As a member of the ELCS, our company will continue contributing to efforts to achieve its goals. Moreover, in the recent Kansai Electric Power Group Medium-term Management Plan (2019-2021), we declared our intention to make efforts to reduce environmental load, including tackling climate change as a leading company of “decarbonization.” Among these efforts, with a base of strength in nuclear power generation, we will seek to achieve 6 million kW of renewable installed capacity by the 2030s. We are making these our “two wheels” of non-fossil fuel energy supplies. Through these

CO<sub>2</sub> emission factor results

Compared to the previous fiscal year, the CO<sub>2</sub> emission factor has been greatly improved, and the CO<sub>2</sub> emission factor for fiscal 2018 is expected to be about 0.33 kg-CO<sub>2</sub>/kWh\*<sup>1</sup> (adjusted factor). As a leading company of “decarbonization,” from fiscal 2017 through fiscal 2018, we resumed operation of Takahama Units 3 and 4 and Ohi Units 3 and 4, which had been confirmed to be safe. We have continued to endeavor for their safe and stable operation. These efforts contributed to greatly improving our CO<sub>2</sub> emission factor.

Changes in CO<sub>2</sub> emission factor, etc.



\*<sup>1</sup> This value is provisional. Based on the Act on Promotion of Global Warming Countermeasures and subsidiary documents, the actual value of the CO<sub>2</sub> emission factor will be officially announced by the national government.  
\*<sup>2</sup> These were calculated based on the Act on Promotion of Global Warming Countermeasures and subsidiary documents. Adjusted factors include adjustments for environmental value that accompany the feed-in tariff for renewable energy.

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Eco Action (Initiatives contributing to the realization of a low-carbon society)

Item	FY 2018		FY 2019
	Targets	Results	Targets
Advancing efforts to control CO2 emissions	• About 0.37 kg-CO2/kWh*1 for the entire electric power business by FY 2030	• Electric Power Council for a Low Carbon Society (FY 2017): 0.496 kg-CO2/kWh*1 (Our company (FY 2018) ) (0.33 kg-CO2/kWh*1.*2)	• Keep the top spot for the amount of CO2-free power generation in Japan • Halve CO2 emissions associated with power generation in Japan in FY 2030 (compared to FY 2013) • About 0.37 kg-CO2/kWh for the entire electric power business by FY 2030
Continuing safe and stable operation of nuclear power plants	• Advance efforts to operate nuclear power plants that make safety the top priority	• We continued the safe and stable operation of plants that had resumed operating. • We implemented safety improvement measures that conform to new regulatory requirements and voluntary efforts for various other safety measures.	Continued
Developing and utilizing renewable energy sources further	• Development and promotion of renewable energy, 500,000 kW (2030)	• Renewable energy development: 3 locations, 3,890 kW*3 (Cumulative total: 111,824 kW) • Renewable energy purchased: 5.72 billion kWh	• Achieve 6 million kW of installed capacity by 2030s (more than 2 million kW will be newly developed in Japan and abroad)
Contributing to the realization of low carbon societies through overseas power generation businesses	• Increase low carbon power supplies through overseas power generation businesses	• Promotion of hydroelectric power construction: 2*4 Participation in renewable energy investment projects: 2*5 Developing country support efforts under GSEP*6 framework: 1*7	
Maintaining and improving the thermal efficiency of thermal power plants (lower heating value base)	• Maintain and improve thermal efficiency	• Thermal efficiency 49.0%	• Benchmark indicators*8 (A: 1.00, B: 44.3%)
Reducing transmission and distribution loss	• Reduce from current level	• 5.05%	Continued
Promoting use of innovative forms of energy among customers and communities	• Contribute to making energy use by customers and society more sophisticated	• We worked to expand use of devices and services that contribute to more sophisticated utilization of energy by customers and society. Smart meters deployed: 1.26 million/year (Cumulative total: 10.58 million), progress rate: about 81%	Continued
Limiting SF6 emissions (calendar year basis) (gas recovery rate upon inspection/removal of equipment)	• 97% (upon inspection) • 99% (upon removal)	• 98.5% (upon inspection) • 99.3% (upon removal)	Continued

\*1 Amount of CO2 emissions per unit of electricity use (sales)

\*2 This value is provisional. Based on the Act on Promotion of Global Warming Countermeasures and other factors, the actual value of the CO2 emission factor will be officially announced by the country.

\*3 Ako Nishihama Solar Power Station (1,990 kW, began operation in June)  
Keihanna Solar Power Station (1,000 kW, began operation in September)  
Nagatono Hydropower Plant (900 kW, began operation in June)

\*4 Rajamandala Hydroelectric Power Project in Indonesia (47 MW), Nam Ngiep 1 Hydropower Project in Laos (290 MW)

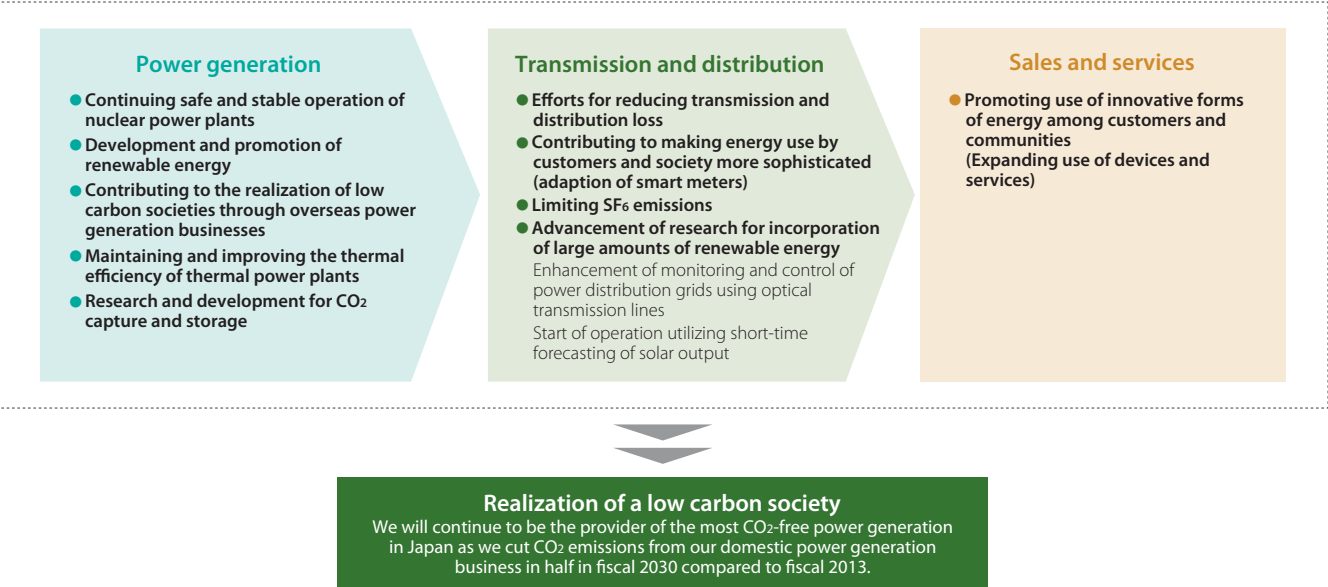
\*5 Triton Knoll Offshore Wind Power (857 MW), Moray East Offshore Windfarm (950 MW)

\*6 Global Sustainable Electricity Partnership

\*7 Hydroelectric power workshop in Nepal

\*8 Indicators based on the benchmark system of the Law Concerning the Rational Use of Energy

Advancement of efforts in the value chain for the realization of a low carbon society



Lowering electric power’s carbon intensity

We are working to reduce the carbon impacts of electricity that we provide to customers, starting with efforts for the operation of nuclear power plants with safety as the first priority. Our efforts also include the development and popularization of renewable energies as well as the maintenance and improvement of the thermal efficiency of thermal power plants.

Nuclear power generation prioritizing safety

Since nuclear power generation emits no CO2, it is an important source of energy that prevents global warming. With understanding of residents of local communities, we continue the safe and stable operation of plants that have resumed operation and restart plants as soon as the safety is

confirmed by appropriately responding to examinations of the Nuclear Regulation Authority. We will also keep independently and continuously promoting safety measures that exceed regulatory requirements.

Development and promotion of renewable energy

As a leading “low-carbon” company, with the goal of having 6 million kW of facility capacity for renewable energy sources in Japan and abroad by the 2030s, our corporate group is working for the development of at least 2 million kW in new capacity.

In Japan, we have been working to increase the output of existing hydroelectric power plants and to develop power generation using renewable energy sources, including land-based wind, solar and biomass. As of March 31, 2019, we announced the start of operation for about 3.45 million kW of generation capacity. We will contribute to the carbon reduction of power in Japan by advancing the steady commercialization of projects that are under development as we utilize the FIT system. We will also contribute to regional development and continuously operate power sources that we have developed and acquired as we focus on independence from FIT and unceasingly endeavor to reduce power generation costs.

Moreover, utilizing the expertise we have gained through our business activities, we will advance renewable energy businesses overseas, including hydroelectric and wind power generation in locations around the world.

Through these efforts, we will actively contribute to the resolution of global issues related to SDGs, ESG and decarbonization.

In March 2018, we decided to have our company participate in a biomass power generation project\*3 in the town of Kanda in Miyako, Fukuoka Prefecture with our company providing 100% of the financing. We held a groundbreaking ceremony in March 2019 and have since been advancing construction work, seeking to start commercial operation in October 2021.

In March 2019, we also decided to invest and participate in a biomass power generation project\*4 in Iwaki City, Fukushima Prefecture with ABLE Co., Ltd., a local company and others. Seeking to start operation in April 2022, we will continue steadily advancing efforts.

\*1 Operation started June 1, 2018. Rated output is 1,990 kW.

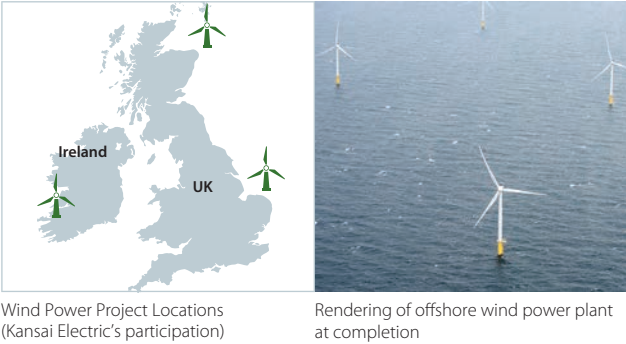
\*2 Operation started September 1, 2018. Rated output is 1,000 kW.

\*3 Rated output is about 75,000 kW.

\*4 Rated output is 112,000 kW. The core business is ABLE Energy LLC. (Investment shares are 50% our company, 45% ABLE Co., Ltd. and 5% Kyudenko Corporation.)

Participation in wind power projects in Europe

In August 2018, our company acquired a stake of an offshore wind power project in the United Kingdom including construction and operation. This is the first case of Japanese electric power utilities entering into overseas offshore wind power project. Furthermore, in November, we participated in another wind power project off the coast of Scotland. The windfarm will be one of the biggest around the globe equipped with 100 large scale wind turbines. Combined with the windfarm in Ireland we joined in 2017, we have participated in three wind power projects in total.



Status of domestic development in fiscal 2018

Our entire group is united in accelerating efforts to incorporate renewable energy sources. In 2018, Kanden Energy Solution Co., Inc., which is a group company, began operating Ako Nishihama Solar Power Station\*1 and Keihanna No. 2 Solar Power Plant\*2.





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### Maintaining and improving the thermal efficiency of thermal power plants and further increasing natural gas use

We continuously undertake measures related to facilities and operation, working to reduce the amount of fuel used and suppress CO<sub>2</sub> emissions by maintaining and improving thermal efficiency.

Our Himeji No. 2 Power Station, one of our largest natural gas-fired thermal power plants, employs a combined-cycle power generation\* with advanced 1,600°C class gas turbines. We are working to suppress CO<sub>2</sub> emissions by increasing thermal efficiency to about 60%, which is the highest global standard, and reducing the amount of fuel used.

Moreover, at Units 1 and 3 of the Aioi Power Station, in addition to the heavy oil and crude oil we had been using, we began using natural gas, which is less expensive and better for the environment, in 2016.

\* Combined cycle power generation: Power is generated by using both gas turbines and steam turbines capturing exhaust heat from the gas turbine with high thermal efficiency.

### Research and development for CO<sub>2</sub> capture and storage

Technologies related to CO<sub>2</sub> capture and storage (CCS) are one promising option for great reduction of CO<sub>2</sub> emissions that result from the use of fossil fuels, and expectations are high for related innovations.

Our company and Mitsubishi Heavy Industries, Ltd. (at the time\*) jointly developed an original energy-conserving CO<sub>2</sub> capture process that uses an amine scrubbing solvent in 1994. This process has already been commercialized and holds the top share in the world for capturing CO<sub>2</sub> from combustion flue gas. In 2018, we advanced research and development to further improve the reliability and economy of this technology. For example, we announced Advanced KM CDR Process™, which is an improved CO<sub>2</sub> capture process that uses new KS-21™ solvent and can lower operation costs.

Furthermore, our company invests and participate in Japan CCS Co., Ltd. Other efforts we are undertaking include collaborating in a large-scale CCS demonstration project that is being led and advanced by the national government.

\* Mitsubishi Heavy Industries Engineering, Ltd. at present

### Promoting use of innovative forms of energy among customers and communities

Through efforts to increase the rate of electrification in the society as a whole and to have electricity used efficiently, we contribute to energy conservation, lower costs and reduced CO<sub>2</sub> while also seeking the realization of a low-carbon society.

### Encouraging efficient energy use

With the goals of realizing energy conservation, cost cutting and CO<sub>2</sub> reduction for our customers and society, we are offering high-efficiency systems that utilize renewable energy sources and heat pump technologies, as well as proposing effective operation procedures, for example. In addition, we are providing total support for energy management to customers and other members of society and undertaking activities that serve these purposes, including the services that allow customers to see energy use.

To our residential customers, we are proposing “total electric conversion” to realize lifestyles that are comfortable, convenient and use energy more skillfully through the adoption of electric appliances, particularly EcoCute energy-efficient hot water supplies.

Moreover, the Hapi e-Miruden Service, which is an Internet notification service for electricity and gas rates and use amounts, allows users to check data, including how much they have used for up to 25 previous months, and compare their energy use with other customers in similar residential situations. In addition, on web pages, we are providing a variety of information related to energy conservation and CO<sub>2</sub> reduction, including energy conservation methods for every kind of household appliance.

We are also providing total support for the energy management of our business customers. For example, we offer proposals for energy systems that are optimized to their various needs, including making energy use more efficient, and explain how to operate these systems. In addition, we work with other

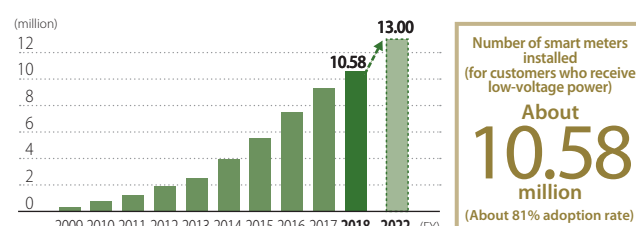
group companies to provide a range of services such as energy conservation diagnoses and energy management support appropriate to the customer's facility usage patterns. We remain committed to helping our customers minimize their energy consumption, achieve cost savings, and reduce their CO<sub>2</sub> emissions.

### Adoption of smart meters

In addition to making amounts of electricity use visible to customers, installing smart meters contributes to the energy conservation of society as a whole, allows flexible handling of various rate options, and enables formation of facilities efficiently according to the conditions of electricity use, among other benefits.

We have completed installation of smart meters for customers that receive high-voltage and extra-high-voltage electricity, and we plan to install them for every customer that receives low-voltage power by fiscal 2022.

#### Number of smart meters installed (for customers who receive low-voltage power)



### Meeting the challenges of large-scale renewable energy use

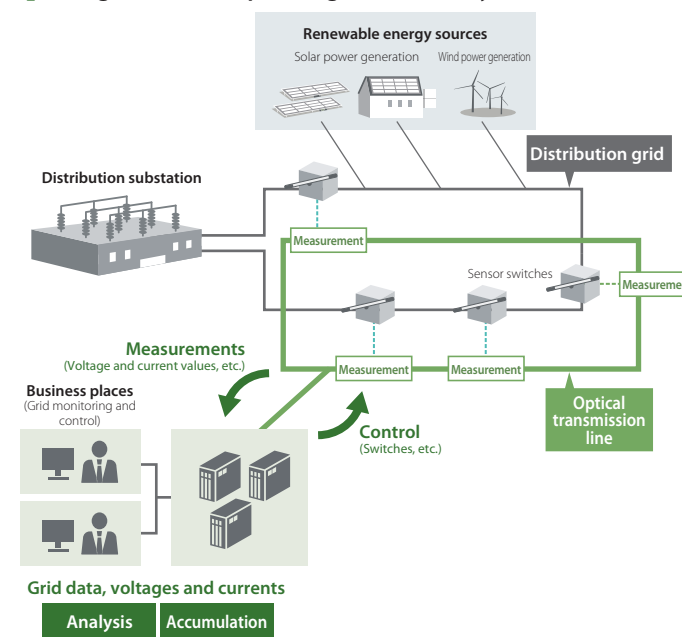
Since the concentrated incorporation of large amounts of renewable energy sources causes concern about impacts on the stability of the power grid, we are promoting research into countermeasure technologies for grid equipment, including the development of supply and demand control technologies with impact evaluation systems, more advanced voltage control and storage batteries.

### Enhancement of monitoring and control of power distribution grids using optical transmission lines

We are advancing the development of an optical transmission system in our automated power distribution system that monitors and controls the distribution grid. This will enable us to rapidly gather measurement data from sensor switches and other equipment and to accurately grasp the status of the distribution grid, including voltage fluctuations and reverse current flows, in real-time.

Through optical transmission lines, voltages, current waveforms and measurement data with cycles as short as one second can be collected, contributing to the advancement of monitoring and control. Moreover, by accumulating and

#### Next-generation dispatching and control system



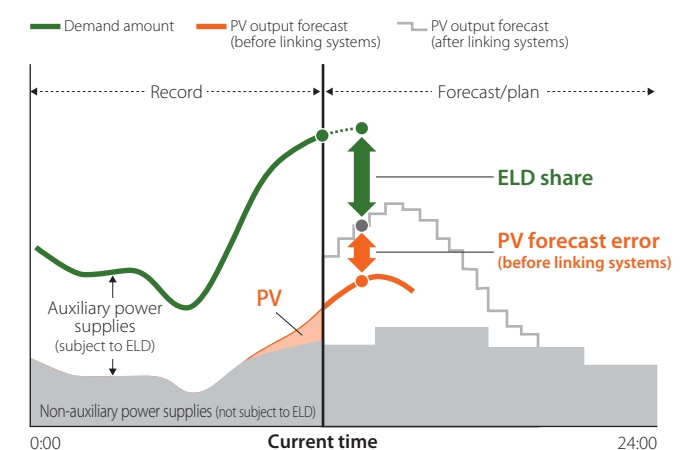
analyzing the collected data, we seek to increase the precision of load identification in the distribution grid and advance efforts toward optimizing facilities and improving usage rates.

### Starting operation utilizing short-time forecasting of solar output

We jointly developed the Apollon solar power short-time forecasting system, which utilizes weather satellite data, with the Meteorological Engineering Center, Inc. In March 2016, we installed a short-time forecasting system for photovoltaic power generation (hereafter, PV) output in our Power Supply Command Center. In this system, since data is refreshed at regular periods and the latest forecasting results are reflected smoothly, PV output forecasts can be obtained with high precision for up to 3 1/2 hours in advance, which contrasts with conventional systems (previous day forecasting). In November 2018, we linked this system with a supply and demand control system, and we also utilize it with the economic load distribution (ELD\*) of power generators.

\* ELD is a system that prioritizes operation of power generators that have lower generation costs.

#### Linking a short-time forecasting system for PV output with ELD function



**ELD concept**  
To make fuel costs for the auxiliary power supplies the most inexpensive, each power generator is given an output command value. The ELD share for the auxiliary power supplies is the demand forecast minus the non-auxiliary power supply planned value and the PV output forecast. For this reason, increasing the precision of predictions and planned values can be expected to increase economy.

### Efforts to reduce greenhouse gases other than CO<sub>2</sub>

We are working to control SF<sub>6</sub> gas emissions, as one of efforts to reduce greenhouse gases other than CO<sub>2</sub>.

### Controlling SF<sub>6</sub> gas emissions

Gas circuit breakers (GCB) are filled with sulfur hexafluoride (SF<sub>6</sub>) gas because of its high insulation performance and other features. This SF<sub>6</sub> gas is a greenhouse gas that the Act on Promotion of Global Warming Countermeasures makes reduction of obligatory.

To control the emission of SF<sub>6</sub> gas into the atmosphere when inspecting the insides of GCB and when removing equipment, we use recovery devices to recover almost all the SF<sub>6</sub> gas beforehand.

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# Initiatives contributing to the realization of a recycling-oriented society

## Policy and concept

We are working actively to reduce emissions and recover resources. For industrial waste generated from our business activities, we are undertaking proactive 3R (reduce, reuse, recycle) efforts with the goal of achieving zero emissions. For ordinary garbage such as copy paper and other office waste, we are also conducting 3R efforts with sorting as the foundation in each business place.

Moreover, as we strictly abide by the Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes and other related laws, depending on the characteristics of the polychlorinated biphenyl (PCB) waste in our possession, we are promoting the safe and secured processing of the entire quantity and advancing green procurement.

### Eco Action (Initiatives contributing to the realization of a recycling-oriented society)

Item	FY 2018		FY 2019
	Targets	Results	
Maintaining industrial waste recycling rate	• 99.5%	• 99.8%	Continue
Proper processing of PCB wastes	• Proceed with certainty to achieve processing before the legal deadline	• Amount of high-concentration PCB processed (Cumulative total): 5,241 *	Continue

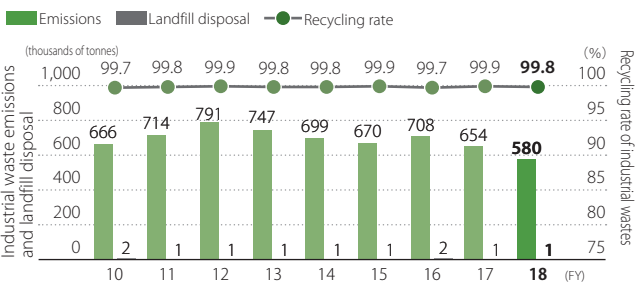
\* Number of high-voltage transformers, condensers and other electrical equipment that were subcontracted to the Japan Environmental Storage & Safety Corporation (JESCO).

## Efforts to achieve zero emissions

The principal types of industrial waste generated by Kansai Electric Power include coal ash from coal-fired thermal power plants and concrete pole fragments remaining from power grid construction. In order to achieve zero emissions, we set a target for our company of “a 99.5% or higher recycling rate” for industrial waste, and we are advancing efforts that include

recycling all coal ash as raw material for cement and paving material for roads, for example. We achieved a 99.8% recycling rate in fiscal 2018, which marks the ninth consecutive year that we have reached our target. We are also working to reduce and recycle general waste, such as printer paper, produced by our offices.

### Changes in emissions and recycling rates for industrial wastes



Note: Industrial waste recycling rate (%) = (industrial waste emissions – landfill disposal amount) / industrial waste emissions × 100

## Polychlorinated biphenyl (PCB) waste processing

Kansai Electric Power uses a range of methods for dealing with the disposal of electrical equipment containing minute amounts of PCBs. We established the Recycling Center for Utility Pole Transformers to render insulating oil and transformer cases harmless and suitable for recycling. At the end of July 2015, we completed processing of stored insulating oil and transformer cases. For other equipment, we

are promoting effective processing using technologies from our group companies. In keeping with government plans, we have commissioned Japan Environmental Storage & Safety Corporation (JESCO) to process waste containing high concentrations of PCB.

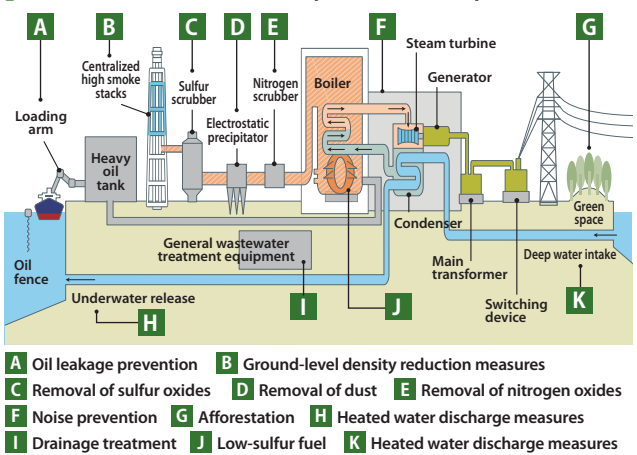
# Promotion of environmental protection in local communities

## Policy and concept

Steadily implementing local environmental protection measures, including preventing air and water pollution, dealing with asbestos issues and preserving biodiversity, we are also strictly managing chemical substances.

At our power plants, for instance, we undertake measures based on laws, local regulations, environmental protection agreements and other rules to reduce air pollution, water pollution, noise, vibrations, and other problems. In addition, we monitor and measure the air and ocean around our power plants and carefully evaluate the environmental effects of our operations on the regional environment to ensure that no problems occur.

### Environmental measures adopted at thermal power stations



### Eco Action (Promotion of environmental protection in local communities)

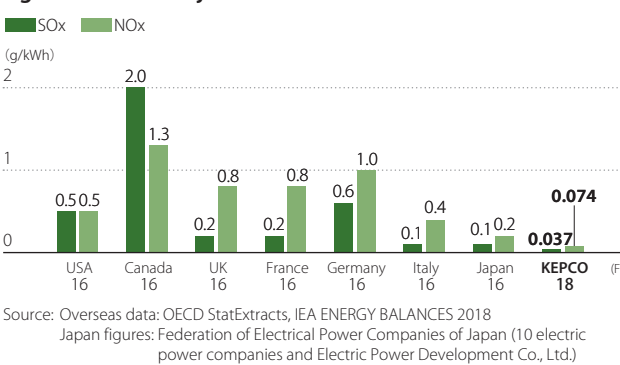
Item	FY 2018		FY 2019
	Targets	Results	
Maintaining sulfur oxide (SOx) and nitrogen oxide (NOx) emission factors	SOx NOx	Maintain one of the world's lowest emission levels • Overall: 0.022 g/kWh • Thermal: 0.037 g/kWh • Overall: 0.043 g/kWh • Thermal: 0.074 g/kWh	• Emission factors: maintain the lowest levels in the world • Emissions: strictly adhere to agreed values at each power plant

## Air pollution prevention measures (SOx, NOx, soot)

Kansai Electric Power has implemented measures aimed at reducing the volume of SOx (sulfur oxides) emitted by our thermal power plants by using low-sulfur fuels, installing sulfur scrubbers, and other measures. To address the issue of NOx (nitrogen oxides), we are taking steps to lower emission

levels, such as improving combustion methods and installing nitrogen scrubbers. As a result, our SOx and NOx emissions per unit of electric power generated are significantly lower than those of the major countries of Europe and North America, remaining among the lowest in the world. In addition, we have installed high-performance electrostatic precipitators that dramatically cut soot emissions.

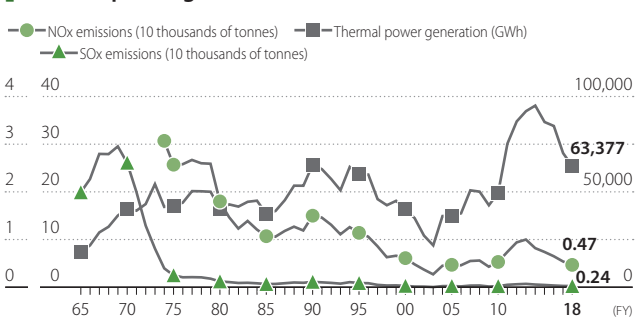
### SOx and NOx emission factors for thermal power generation of major countries and Kansai Electric Power



## Handling chemicals

We regularly monitor the status of buildings and equipment that contain asbestos and systematically advance the removal of asbestos and replacement with non-asbestos products. In these ways, we are managing asbestos suitably as we strictly abide by related laws, regulations and other rules.

### Thermal power generation and SOx and NOx emissions



Moreover, in addition to abiding by the PRTR (Pollutant Release and Transfer Register) System, we are working actively to manage toxic chemicals strictly and to reduce them based on our “Guidelines for Managing Chemicals Subject to PRTR.”

## 2 Proactive Approach with a View to Creating Ever Better Environment

### Conservation of biodiversity

“Business activities that consider preservation of biodiversity” are stipulated in the Kansai Electric Power Group Environmental Action Policy. Based on this, we are endeavoring to preserve biodiversity by identifying and analyzing impacts on the environment in the execution of our business activities and considering plants, animals and ecosystems through environmental assessments at times of power plant construction. For this purpose, we are also undertaking environmental preservation measures suited to the characteristics of communities, including the creation of natural forests through ecological revegetation. In addition, we are actively undertaking efforts to raise environmental awareness through activities such as environmental education utilizing tree-planting activities and coordinating and interacting with local communities.

#### Execution of environmental assessments

When constructing power plants and other facilities, in accordance with the relevant laws of Japan and other countries, we survey, forecast and evaluate the impacts caused to the environment by our businesses. We publish these results, and undertake appropriate consideration to protect and create environments as we confirm the thoughts of residents and others.

#### Natural forest creation

In order to make forests that are similar to nature at power plants in short amounts of time, we are trying to create environments that protect the original biodiversity of the region by selecting cultivated tree saplings that are suited to the region, and planting different species densely in close proximity.

Moreover, in order to maintain natural forests, as we look to the guidance of experts, we are undertaking continuous efforts to preserve biodiversity, including measures to further diversify species and eliminate invasive species.

#### Protecting oriental white storks

In Toyooka City, Hyogo Prefecture, released oriental white storks, which are designated a Special Natural Treasure in Japan, sometimes make their nests on utility poles and steel towers. Not only are there concerns about accidents, but there are also fears that storks could be electrocuted. For these reasons, we patrol carefully, removing nests as quickly as possible and conducting measures to discourage them from coming near utility poles in cooperation with the University of Hyogo and the Hyogo Park of the Oriental White Stork. In these ways, we are both protecting the storks and maintaining the safety and stability of the power supply.



Stork building nest on utility pole

### Promoting environmental communication

We are advancing the disclosure of environmental loads and other data related to our business activities on the Internet and elsewhere. In addition, we are actively working on efforts for activities to raise environmental awareness so that we can



Local preschoolers planting sweet potatoes

think and act for the environment together with people in local communities and our customers.

Furthermore, considering that the trend to make ESG investments has been growing recently, we seek to promote understanding about our corporate environmental efforts, including addressing climate-related issues, through communication with shareholders and institutional investors. We are also reflecting their ideas in our corporate efforts and in improvements to information disclosure.

#### Future plans

As demands grow for environmental efforts, including for the Paris Agreement, which is the international framework for greenhouse gas reduction from 2020, and for the 2030 sustainable development goals (SDGs), we recognize that addressing climate-related issues over the medium and long terms is an important management issue for our company, which develops energy businesses.

Based on this recognition, we set “Cut in half CO<sub>2</sub> emissions that accompany power generation business in Japan by fiscal 2030 (compared to in fiscal 2013)” as a target in our new Medium-term Management Plan. Specifically, we will pursue “low carbon strengths” starting with the utilization of nuclear power generation that puts safety our top priority, and through the further development, incorporation and utilization of renewable energy sources, as well as by increasing the efficiency of thermal power plants and other efforts. Moreover, we will continue to lead carbon reduction in the energy field by increasing the rate of electrification in the society as a whole, by building smart grids including virtual power plants (VPP), and with efforts to expand low-carbon power generation through overseas power generation projects. Furthermore, considering the TCFD Recommendations, we will continue advancing analysis and information disclosure related to climate change risks.

We will keep working steadily to reduce environmental impacts and risks and practice thorough compliance related to the environment.



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